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(54) **SYSTEM FOR ACCESSING SERVICES VIA A TELEPHONE SET**

SYSTEM ZUM ZUGANG ZU DIENSTEN ÜBER EIN FERNSPRECHGERÄT

SYSTEME D'ACCES A DES SERVICES PAR L'INTERMEDIAIRE D'UN COMBINE TELEPHONIQUE

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EP-A- 0 216 521 **EP-A- 0 379 333**
GB-A- 1 396 150

EP 0 560 946 B1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a system for accessing services via a telephone set, more specifically a system comprising a reader which is coupled to the telephone. The reader contains a reader unit which, together with software, can handle smart cards. The reader can communicate with a receiver at the service provider end. The reader has a built-in keyboard for feeding in data.

[0002] The reader is controlled in its entirety from the telephone service which the service purchaser is ringing. This can be a voice answering equipment or any other equipment which is built for communicating with a reader for smart cards. The reader is controlled via any one of the two accessible communication channels.

PRIOR ART

[0003] It has previously been known to order services from a computer equipment via telephone. In this case, the computer is controlled with the aid of the key set on the telephone set and information is obtained from the computer in the form of speech which is generated by the computer. The user himself must keep track of all codes for identification and different instructions to the computer.

[0004] Automatic banking machines are also already known. In these, a card is introduced which identifies the user. The user then requests an amount and feeds in his personal identification code via the key set on the terminal. The automatic banking machines only provide limited services, withdrawal and account information, and the bank card only contains a code which identifies the account.

[0005] EP-A-0 216 521 discloses a system for accessing services via a telephone set according to the preamble of claim 1.

SUMMARY OF THE INVENTION

[0006] The present invention relates to a system for accessing services via a telephone set.

[0007] Other embodiments of the invention are specified in greater detail in the subsequent patent claims. Service providers can increase the security of the existing applications or develop new services with the aid of the reader. Security is guaranteed by the security functions which are built into smart cards. Among other things, these cards can encrypt and sign electronic transactions which, together, have the result that service providers can offer very advanced services via the telephone network. A smart card which is used as information carrier can use the reader for transmitting the stored information items.

SHORT DESCRIPTION OF THE DRAWINGS

[0008] The invention will now be described in detail with reference to the subsequent drawings, in which:

Figure 1 is a block diagram of the arrangement according to the invention connected to a telephone system; and

Figure 2 is a block diagram of an alternative coupling of the arrangement according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

[0009] Figure 1 shows the arrangement according to the invention coupled to a telephone system. The arrangement is located at the subscriber who is a service purchaser. A connection can be coupled via a telephone system, for example the general telephone network, to a service provider, one of which is shown. At the service provider station, a computer and communication equipment are located.

[0010] The arrangement according to the invention consists of a card reader for smart cards. The reader is connected in parallel with the telephone to a normal telephone jack via a standard adaptor plug. The reader contains a reader unit which, together with software functions, can handle smart cards. The reader can communicate with the receiver at the service provider station either by means of tone dialling signalling and/or by means of a modem. It also has a built-in keyboard for feeding in data. The reader is completely controlled from the telephone service which the user is calling. The computer equipment of the telephone service normally has a voice answering equipment or other equipment intended for communicating with a reader. The reader is controlled via any one of the two communication channels which are accessible, by means of tone dialling signalling or modem.

[0011] Figure 2 shows an alternative way for connecting the reader. The reader is here directly connected via its plug to the telephone network and the telephone set is coupled directly to the card reader. Here, too, the reader and the telephone set are coupled in parallel.

[0012] It is also possible to build the telephone set and the card reader together to form one unit. In this case, the unit has only one key set and a slot for introducing the smart card.

[0013] The reader is controlled by a central processing unit. This is an eight-bit central processing unit designed for maximum integration of the card reader's functions directly in the central processing unit. The central processing unit is made in CMOS technology which ensures low current consumption. Internally, there is a random-access memory RAM with 256 bytes which is adequate for the functions to be carried out by the reader. The program code can be stored in a programmable read-only memory PROM or mask-programmed directly

in the central processing unit for minimising current consumption and price.

[0014] The card reader is equipped with a built-in keyboard which contains 12 keys: the digits 0-9 and characters * and #. The appearance corresponds to key sets of normal telephones. The keyboard is directly coupled to the central processing unit which eliminates the risk of leakage of information fed in.

[0015] The reader unit itself is designed for being mounted directly on the circuit board which is important for keeping down the total size and price of the construction. The reader unit is adapted to be able to handle all smart cards on the market. The reader unit is completely passive and is only a link between the card and the central processing unit. The central processing unit can communicate with the card via the reader unit and contribute power supply and clock. Different feed voltages and clock frequencies are supplied to the card depending on which card is connected.

[0016] The basic communication with the computer equipment called occurs with the aid of tone dialling signalling. The reader is equipped both with tone dialling transmitter and receiver.

[0017] The transmission speed is normally 10 characters (10 x 4 bits) per second. The tone dialling receiver is coupled in parallel with the normal telephone traffic which means that it can receive data both from the user's telephone and from the telephone network. The reader also contains a relay for disconnecting the user when the reader and the service provider's equipment are directly communicating with one another.

[0018] Since tone dialling signalling greatly limits the amount of data which can be transferred, the reader is also equipped with a built-in modem. The modem can handle communication according to CCITT V.21 and V.23 which provides a transmission speed of up to 1200 bps. This gives higher flexibility with respect to the functions to be executed by the reader.

[0019] The reader is also provided with a number of light-emitting diodes in different colours, the functions of which are described below.

[0020] The reader is built up of low-current components but the component with the highest current demand is the smart card. Since different cards are being used, the current consumption cannot be calculated accurately. Moreover, the cards draw more current when they are being written on, so the current consumption varies with time.

[0021] The power supply is provided by a battery or by a battery eliminator. A 9-V alkaline battery supplies continuous drive for the reader for approximately 3-4 hours. One of the abovementioned light-emitting diodes indicates low battery voltage and need for exchanging the battery.

[0022] When a card is inserted into the reader unit of the reader, the reader automatically starts. When the card is pulled out, the reader is shut down. Since smart cards are dependent on the power supply from the read-

er, they are returned to rest position when they are pulled out of the reading unit. When the reader is started by inserting a card into the reader unit, a yellow light-emitting diode is illuminated. The reader tests the card in order to identify the type of smart card which is being used. If the card is recognised, the yellow light-emitting diode is extinguished and the reader is ready for use. This means that the reader proceeds to listen to tone signals which are sent from the called system. If the reader does not recognise the card as one of the acknowledged types, the card is either of an unknown type or misused. A red light-emitting diode is then illuminated and the reader waits for the card to be pulled out. All calls to the reader then only produce an error message as response.

[0023] The user can feed data in locally to the reader with the aid of the keyboard. The information items fed in can then be used as data for an instruction to the card. The most usual type of information fed in is a personal code which will be tested in the card but it can also be another type of data, for example information to be encrypted. None of the operations at the keyboard will be output in plain text on the telephone line. The reader accepts the input from the keyboard after an instruction from the called system. When this happens, a green light-emitting diode is illuminated in order to indicate that the data will be fed in. The input is concluded with "#" and the green light-emitting diode is extinguished. When the light-emitting diode is extinguished, no operations at the keyboard will be stored or sent out on the line.

[0024] In the connected condition, the reader continuously listens to the data in the form of tone signals or via the modem, which are sent from the called system. When a start character is detected, the reader interprets this as a start of an instruction. The telephone is then disconnected from the line and the reader changes into instruction mode. The reader now collects all data including the signal "#", which indicates the end of the instruction. If a holdup of more than one second occurs between the different characters, the instruction is considered to be disturbed and the reader goes back to looking for the start character. When the entire instruction is received, it is decoded and executed. After the executed instruction, the reader always sends back a response. After that, the telephone is connected again to the line and the reader goes back to listening. When the modem is connected, the user is always disconnected from the line. From the moment the reader has detected the start character to the time when the reader has sent out the complete response, the yellow light-emitting diode is lit.

[0025] The reader always starts in tone dialling mode, that is to say it listens for tone dialling signals from the called system. An instruction can be used for changing communication channel and instead coupling in the modem. Thus, a number of different operating conditions are obtained: tone dialling signalling and signalling by means of the modem with different transmission

speeds. The operating condition of the modem can be changed while modem traffic is in progress by means of a new instruction on the modem line. This provides, for example, the possibility of switching between 1200/75 bps as transmission speed. The response to the instruction is always given on the communication channel on which the instruction is sent, tone dialling or modem. Only after the response has been sent out does the exchange of communication channel or operating condition of the modem occur.

[0026] The reader can be commanded to accept data from the user via the keyboard by sending an instruction. The green light-emitting diode is illuminated in order to indicate that there will be input from the keyboard. The inputting is concluded by the user pressing the # character. The green light-emitting diode is extinguished when inputting is concluded. The user has a maximum of 30 seconds for feeding in data. If inputting is not concluded within this time, an error code is returned instead. This instruction is normally used for accepting the personal identification code which is to be used for opening the connected card.

[0027] An instruction can be directly sent to the connected card. The reader waits for a response from the card and then sends this back. The reader waits for the response for a maximum of 30 seconds. After that, an error code is returned instead. The reader only examines the length of the instruction as a check that a sufficient amount of data has been sent over. Otherwise, there is no check of the instruction. It is the task of the calling system to see that the instruction follows the specification for the connected card.

[0028] If data have been fed in from the keyboard, they can be transmitted to the connected card by means of a special instruction. The input data are stored in the keyboard buffer and transmitted to the card together with the instruction. Here, too, only the length of the data in the keyboard buffer is checked.

EXAMPLE

[0029] The arrangement according to the invention can be used for obtaining bank services. The service provider station is therefore the computer equipment of a bank for checking different accounts. The service purchaser is an account owner who has been allocated a smart bank card. To use the card, the user first calls up the bank via the telephone set and feeds the card into the card reader. When communication has been established, the computer equipment senses what the card is and what account is accessible. The user confirms his authorization by feeding in his personal identification code which is usually secret. The user can then obtain information on various accounts, carry out transactions and obtain other services by inputting requested information by means of the keyboard. At the same time, the computer equipment and the smart card automatically interact for transmitting information.

[0030] The card reader can be based at the account owner's home. It is also conceivable that the card reader is generally accessible, for example at post offices and banks. After each transaction, the user can be requested to sign the transaction by inputting a further code.

[0031] The arrangement according to the invention can also be used for obtaining services from a pharmacy. The card can then be programmed with a prescription, medical status or the like on a visit to the hospital or to the doctor. The card can also specify the amount of medicine which is dispensed within a certain time. The card user can use the card for ringing in prescription orders to the pharmacy. The card and the computer equipment at the pharmacy then interact so that the correct medicine is dispensed. The card keeps track of how much medicine is dispensed and within what time.

[0032] The arrangement according to the invention can also be used as means for payment for purchases by telephone. A video film hire shop, for example, can sell cards which have been programmed with a certain number of films in the form of units which are counted down with each purchase or hire. The smart card then has the function of a credit card or payment card.

[0033] Other embodiments of the invention are apparent to an expert in the field. The invention is only limited by the patent claims following.

Claims

1. System for accessing services via a telephone set comprising a telephone set/telephone subscription, an identity card of a service purchaser and a card reader in a telecommunication system and a call-receiving device, a computer equipment of a service provider in the telecommunication system for accessing services with the identity card and the telephone set/telephone subscription, wherein calls from the service purchaser are effected by means of the identity card from the telephone set/telephone subscription in the telecommunication system, wherein the identity card is inserted in the card reader connected to the telephone set for connection of the telephone set/telephone subscription to the computer equipment of the service provider via the telecommunication system, and the call-receiving device of the service provider connects the service provider with the service purchaser, wherein the computer equipment of the service provider communicates with the telephone set/telephone subscription and the identity card in the card reader of the service purchaser during a connection effected between the service purchaser and the computer equipment of the service provider, wherein the computer equipment is arranged to identify the service purchaser by means of data existing/programmed in the identity card, wherein means for inputting an authorization code assigned to the purchaser, after

- identification of the service purchaser, possibly at the request of the computer equipment of the service provider, are provided wherein the computer equipment of the service provider includes means for initiating the access of the service to the service purchaser by way of the authorization code and wherein the computer is arranged to control the card reader in the connected condition **characterized** in that the identity card of the service purchaser is a smart card containing identification data and other information such as prescription, medical status, etc. and in that during a communication between the service provider and the service purchaser, the computer equipment of the service provider and the smart card of the service purchaser are arranged to interact via the card reader for transmitting and exchanging information.
2. System according to claim 1, **characterized** in that the card reader comprises a keyboard for inputting information to the identity element and computer equipment.
 3. System according to any of the preceding claims, **characterized** in that the card reader is equipped with tone signal transmitter and receiver.
 4. System according to any of the preceding claims, **characterized** in that the card reader is equipped with a modem.
 5. System according to any of the preceding claims, **characterized** in that the card reader is connected to the telephone system in parallel with the telephone set, preferably by means of an adaptor plug.
 6. System according to any of the preceding claims, **characterized** in that the card reader is built into the telephone set which is provided with a slot for inserting the identity element.
 7. System according to any of the preceding claims, **characterized** in that the card reader is provided with means for inputting an authorization code by the service purchaser, at a request by the computer equipment, for the required service to become accessible and/or for confirming the required transaction.
 8. System according to any of the preceding claims, **characterized** in that the service provider consists of a bank, mail order firm, film hire shop or pharmacy.
 9. System according to claim 8, **characterized** in that, in the case of the pharmacy service, information about prescription, medical status and the like is introduced on the identification element.
 10. System according to any of the preceding claims, **characterized** in that, in the case of a sales function, the identity element is provided with units which can be counted down, for example a number of goods, which are counted down on the basis of the use of the identity element.
 11. System according to any of the preceding claims, **characterized** in that two-way communication occurs in several steps between the computer equipment and the service purchaser.
 12. System according to any of the preceding claims, **characterized** in that the computer equipment is arranged to provide acknowledgement/voice response with respect to the service requested by the service purchaser.

Patentansprüche

1. System zum Zugriffnehmen auf Dienste über ein Telefongerät, das ein Telefongerät/einen Telefonanschluß, eine Identitätskarte eines Dienstleistungskäufers und einen Kartenleser in einem Telekommunikationssystem und eine rufempfangende Einrichtung, eine Computerausrüstung eines Dienstleistungsanbieters im Telekommunikationssystem zum Zugriffnehmen auf Dienste mit der Identitätskarte und dem Telefongerät/Telefonanschluß aufweist, wobei Anrufe vom Dienstleistungskäufer mit Hilfe der Identitätskarte vom Telefongerät/Telefonanschluß im Telekommunikationssystem bewirkt werden, wobei die Identitätskarte in den mit dem Telefongerät verbundenen Kartenleser eingeführt wird, um Verbindung des Telefongeräts/Telefonanschlusses mit der Computerausrüstung des Dienstleistungsanbieters über das Telekommunikationssystem herzustellen, und wobei die rufempfangende Einrichtung des Dienstleistungsanbieters den Dienstleistungsanbieter mit dem Dienstleistungskäufer verbindet, wobei die Computerausrüstung des Dienstleistungsanbieters mit dem Telefongerät/Telefonanschluß und der Identitätskarte im Kartenleser des Dienstleistungskäufers während einer Verbindung kommuniziert, die zwischen dem Dienstleistungskäufer und der Computerausrüstung des Dienstleistungsanbieters hergestellt ist, wobei die Computerausrüstung so ausgebildet ist, daß sie den Dienstleistungskäufer mit Hilfe von Daten identifiziert, die in der Identitätskarte existieren/programmiert sind, wobei Mittel zum Eingeben eines Berechtigungscode, der dem Käufer zugeordnet ist, nach Identifizierung des Dienstleistungskäufers, möglicherweise auf Anforderung der Computerausrüstung des Dienstleistungsanbieters vorgesehen sind, wobei die Computerausrüstung des Dienstleistungsanbieters Mittel zum

- Starten des Zugriffs auf den Dienst zum Dienstleistungskäufer mit Hilfe des Berechtigungscode einschließt, und wobei der Computer so ausgebildet ist, daß er den Kartenleser im verbundenen Zustand kontrolliert, dadurch gekennzeichnet, daß die Identitätskarte des Dienstleistungskäufers eine Chipkarte (Smart Card) ist, die Identifikationsdaten und andere Information wie z. B. Rezept, medizinischen Zustand usw. enthält, und daß während der Kommunikation zwischen dem Dienstleistungsanbieter und dem Dienstleistungskäufer die Computerausrüstung des Dienstleistungsanbieters und die Chipkarte des Dienstleistungskäufers so ausgebildet sind, daß sie über den Kartenleser zum Übertragen und Austauschen von Informationen wechselwirken.
2. System nach Anspruch 1, dadurch gekennzeichnet, daß der Kartenleser eine Tastatur zum Eingeben von Information zum Identitätselement und zur Computerausrüstung aufweist.
 3. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Kartenleser mit einem Tonsignalsender und -empfänger ausgestattet ist.
 4. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Kartenleser mit einem Modem ausgerüstet ist.
 5. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Kartenleser mit dem Telefonsystem parallel mit dem Telefongerät, vorzugsweise mit Hilfe eines Adaptersteckers verbunden ist.
 6. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Kartenleser in das Telefongerät eingebaut ist, das mit einem Schlitz zum Einführen des Identitätselements versehen ist.
 7. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Kartenleser mit Mitteln zum Eingeben eines Berechtigungscode durch den Dienstleistungskäufer auf Anforderung durch die Computerausrüstung versehen ist, damit der gewünschte Dienst zugänglich wird und/oder um die gewünschten Transaktionen zu bestätigen.
 8. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Dienstleistungsanbieter aus einer Bank, einer Postbestellfirma, einem Filmverleihgeschäft oder einer Apotheke besteht.
 9. System nach Anspruch 8, dadurch gekennzeichnet, daß im Falle eines Apothekendienstes Information über Rezept, medizinischen Zustand und ähnliches auf dem Identifikationselement enthalten ist.
 10. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß im Falle einer Verkaufsfunktion das Identifikationselement mit Einheiten versehen ist, die in Abwärtsrichtung gezählt werden können, z. B. eine Anzahl von Waren, die aufgrund der Verwendung des Identifikationselementes in Abwärtsrichtung gezählt werden.
 11. System nach einem vorangehenden Anspruch, dadurch gekennzeichnet, daß Kommunikation in beiden Richtungen in mehreren Schritten zwischen der Computerausrüstung und dem Dienstleistungskäufer stattfindet.
 12. System nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Computerausrüstung so ausgebildet ist, daß sie Bestätigung/Sprachreaktion in Bezug auf den Dienst liefert, der durch den Dienstleistungskäufer angefordert wird.

Revendications

1. Système pour accéder à des services par l'intermédiaire d'un poste téléphonique comprenant un poste téléphonique/abonnement téléphonique, une carte d'identité d'un acheteur de services et un lecteur de carte dans un système de télécommunications et un dispositif récepteur d'appels, un équipement informatique d'un fournisseur de services dans le système de télécommunications pour accéder à des services avec la carte d'identité et le poste téléphonique/abonnement téléphonique, dans lequel des appels provenant de l'acheteur de services sont effectués aux moyens de la carte d'identité à partir du poste téléphonique/abonnement téléphonique dans le système de télécommunications, dans lequel la carte d'identité est insérée dans le lecteur de carte connecté au poste téléphonique pour connexion du poste téléphonique/abonnement téléphonique à l'équipement informatique du fournisseur de services par l'intermédiaire du système de télécommunications et le dispositif récepteur d'appels du fournisseur de services connecte le fournisseur de services à l'acheteur de services, dans lequel l'équipement informatique du fournisseur de services communique avec le poste téléphonique/abonnement téléphonique et la carte d'identité située dans le lecteur de carte de l'acheteur de services pendant une connexion effectuée entre l'acheteur de services et l'équipement informatique du fournisseur de services, dans lequel l'équipement informatique est agencé de manière

- à identifier l'acheteur de services au moyen de données existantes/programmées dans la carte d'identité, dans lequel des moyens destinés à entrer un code d'autorisation attribué à l'acheteur, après identification de l'acheteur de services, par exemple à la requête de l'équipement informatique du fournisseur de services, sont fournis, dans lequel l'équipement informatique du fournisseur de services comporte des moyens pour initialiser l'accès du service à l'acheteur de services au moyen du code d'autorisation et dans lequel l'ordinateur est agencé de manière à contrôler le lecteur de carte dans l'état connecté, caractérisé en ce que la carte d'identité de l'acheteur de services est une carte à puce contenant des données d'identification et d'autres informations telles qu'une prescription, un état médical, etc. et en ce que, pendant une communication entre le fournisseur de services et l'acheteur de services, l'équipement informatique du fournisseur de services et la carte à puce de l'acheteur de services sont agencés de manière à interagir par l'intermédiaire du lecteur de carte pour la transmission et l'échange d'informations.
2. Système selon la revendication 1, caractérisé en ce que le lecteur de carte comprend un clavier destiné à entrer des informations vers l'élément d'identité et l'équipement informatique.
 3. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que le lecteur de carte est équipé d'un émetteur et d'un récepteur de signaux de tonalités.
 4. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que le lecteur de carte est équipé d'un modem.
 5. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que le lecteur de carte est connecté au système téléphonique en parallèle avec le poste téléphonique, de préférence au moyen d'une fiche d'adaptation.
 6. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que le lecteur de carte est construit dans le poste téléphonique qui est pourvu d'une fente destinée à insérer l'élément d'identité.
 7. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que le lecteur de carte est pourvu de moyens pour entrer un code d'autorisation par l'acheteur de services, à la demande de l'équipement informatique, pour que le service demandé devienne accessible et/ou pour confirmer la transaction demandée.
 8. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que le fournisseur de services est constitué d'une banque, d'une société de vente par correspondance, d'un magasin de location de films ou d'une pharmacie.
 9. Système selon la revendication 8, caractérisé en ce que, dans le cas du service d'une pharmacie, des informations concernant la prescription, l'état médical et analogue, sont introduites sur l'élément d'identification.
 10. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que, dans le cas d'une fonction de vente, l'élément d'identité est pourvu d'unités pouvant être décomptées, par exemple un certain nombre de marchandises, qui sont décomptées sur la base de l'utilisation de l'élément d'identité.
 11. Système selon l'une quelconque des revendications précédentes, caractérisé en ce qu'une communication bilatérale s'effectue en plusieurs étapes entre l'équipement informatique et l'acheteur de services.
 12. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que l'équipement informatique est agencé de manière à fournir un accusé de réception/réponse vocale concernant le service demandé par l'acheteur de services.

